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Technical Report 770

**AD-A192 070**

# **Framework for Research on Leadership, Cohesion, and Values**

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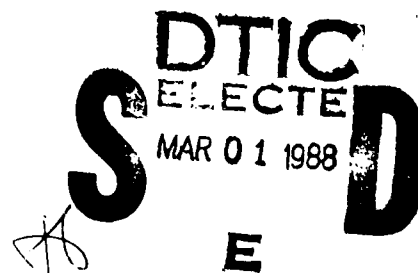


U. S. Army

**Research Institute for the Behavioral and Social Sciences**

**November 1987**

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Research accomplished under contract  
for the Department of the Army

Battelle Columbus Laboratories

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ARI Technical Report 770	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) FRAMEWORK FOR RESEARCH ON LEADERSHIP, COHESION, AND VALUES		5. TYPE OF REPORT & PERIOD COVERED Final Report October 1986-August 1987
		6. PERFORMING ORG. REPORT NUMBER --
7. AUTHOR(s) John S. Butler (Univ of Texas, Austin), Robert L. Phillips (Texas Tech), John D. Blair (Texas Tech), and Neal Schmitt (Michigan State Univ)		8. CONTRACT OR GRANT NUMBER(s) DAAL03-86-D-0001 Delivery Order 0111
9. PERFORMING ORGANIZATION NAME AND ADDRESS Battelle Columbus Laboratories 200 Park Drive, P.O. Box 12297 Research Triangle Park, N.C. 27709		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q263743A794 Task 4.5.2.C.3
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Research Office P.O. Box 12211 Research Triangle, NC 27709		12. REPORT DATE November 1987
		13. NUMBER OF PAGES 58
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue Alexandria, VA 22333-5600		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE --
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  --		
18. SUPPLEMENTARY NOTES This research was performed under a Scientific Services Agreement with Battelle Columbus Laboratories, 200 Park Dr., P.O. Box 12297, Research Triangle, NC 27709. The research was requested and funded by the Monitoring Agency. Guy L. Siebold, ARI, was the technical monitor.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Cohesion Leadership Values Organizational synergy		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The purpose of the following report is to develop a systematic framework for research on cohesion in conjunction with leadership and values. The report is divided into an introduction and four sections. The first section, entitled "Cohesion, Leadership, and Values: The Problem in Comparative Organizations," stresses the importance of understanding the problem in different kinds of organizations. Section Two, entitled "Synergy in a Unique Organization Under Stress: The Army Unit in Combat," introduces and defines our guiding (Continued)		

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20. ABSTRACT (Continued)

theoretical concept--organizational synergy, which serves as a nesting ground for leadership, values, and cohesion. Section Three, "Determinants of Organizational Synergy," is the specification of variables that can be utilized to predict our major concept. Section Four, "Framework for Future Research," presents a plan for research. This final section specifies relevant literature, identifies concepts to be measured mathematically, and shows how they can be combined into one statistical model that can be estimated.

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Office, Deputy Chief of Staff for Personnel  
Department of the Army

November 1987

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Army Project Number  
2Q263743A794

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## FOREWORD

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The Leadership and Management Technical Area conducts research to enhance leadership, cohesion, and values in the Army. A major focus is developing the technology to aid unit leaders in building and maintaining cohesion and commitment in their units. One of the recurrent problems in this task is the difficulty of determining the most useful ways to conceptualize and measure cohesion. This report looks at past efforts to overcome these difficulties, develops a new alternative conceptualization, and suggests advanced approaches to measurement.

In particular, the authors draw upon their behavioral science and management backgrounds to put forth the conceptualization of cohesion in terms of organizational synergy, by which they mean the increase or value added to the whole, which is more than the sum of the constituent components of peer cohesion, leadership, and organizational commitment. The results contained in this report will be integrated into appropriate areas of ongoing advanced development research programs to improve the leadership and management of Army units. These wider programs are sponsored by the Combined Arms Center, including the Center for Army Leadership at Fort Leavenworth, Kansas, and the Office of the Deputy Chief of Staff for Personnel.



EDGAR M. JOHNSON  
Technical Director

# FRAMEWORK FOR RESEARCH ON LEADERSHIP, COHESION, AND VALUES

## EXECUTIVE SUMMARY

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### Requirement:

One of the recurrent problems in conducting research to enhance cohesion, leadership, and values in the Army has been the difficulty in determining the most useful ways to conceptualize and measure cohesion. The requirement for this research was to look at previous efforts to conceptualize and measure cohesion and suggest how to improve upon them in ways more useful to the Army.

### Procedure:

To meet the requirement, our approach was to do the following:

Review the literature on cohesion.

Assess the range of definitions of cohesion.

Analyze the advantages and disadvantages of the various definitions.

Formulate a construct (Organizational Synergy) to better account for the observations revealed in the literature review.

Define and suggest measurements of the three elements of organizational synergy--peer cohesion, leader influence, and organizational commitment.

Provide a mathematical formulation of the construct.

Present several notional cases of the application of the construct to account for observed situations.

### Findings:

Conceptual considerations and empirical research led to the finding that there are five major groups of determinants of group synergy:

Organizational Variables: Climate, communication, and control.

Individual Variables: Values and demographic characteristics.



Group Variables: Group size, homogeneity of values, demographic similarity, participative decision making, internal and external competition, shared successful experience, unit identification, adversity, and leadership competence.

Task Variables: Type of task or work, physical proximity of group members, and the psychological experience of work.

Policy Variables: Equipment or resources, rotation or replacement, housing policy, benefits and dependents' support, and contrast in quality of life between officers and enlistees.

Research and conceptual considerations also indicate that high organizational synergy should have two important outcomes--high unit performance and less combat stress reaction.

A research effort on group synergy is likely to encounter several research and design problems. These problems and potential solutions are as follows:

The possible reciprocal relationship between unit performance and synergy can be investigated with the use of longitudinal and analytical techniques, such as LISREL and two-stage least squares, which are designed to assess the relative strength of the two possible causal directions. Lagged sequential designs may also afford the possibility of determining the direction of causality when, as is possible with the synergy-performance relationship, the causal effect is likely to be delayed.

Nonlinear or interactive effects may be investigated by means of power and product terms in hierarchical regression analyses.

Level of analysis issues are best resolved by conceptual considerations, but the appropriateness of group- or individual-level analysis may be checked empirically by procedures that allow the analysis of variance of measured variables.

In some instances it may be argued on a conceptual basis that lack of group synergy may affect the variance in group members' performance rather than the average level of performance. In those instances, it is appropriate to use a logarithmic transformation of group variances as the variable of interest.

#### Utilization of Findings:

The report is designed to be utilized by the U.S. Army Research Institute for the Behavioral and Social Sciences in its efforts to improve the leadership and management of Army units. The theoretical and mathematical formulation provided in the report specifies a framework for research.

# FRAMEWORK FOR RESEARCH ON LEADERSHIP, COHESION, AND VALUES

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# FRAMEWORK FOR RESEARCH ON LEADERSHIP, COHESION, AND VALUES

## INTRODUCTION

The purpose of our effort is to develop a framework for the examination of leadership, cohesion, and values within military organizations, with an emphasis on the cohesion component. The development of such a framework is contingent on moving towards the successful conceptualization and measurement of these concepts. Like all abstract concepts, turning them into mathematical measurable variables is a complicated task which depends on intense research which establishes, and re-establishes, the validity of the measurement process. One of our major concerns is to show how leadership, cohesion, and values can be conceptualized and measured. Because we know that these concepts are not mutually exclusive, it is necessary to examine how they are interrelated as indicated by the measurement process. Thus the major problem addressed in this paper is centered on problems of measuring leadership, cohesion, and values.

We are aware that our major concepts, when measured, operate within an organizational context. Although our concern is with military specific organizations (squad, platoon, company, etc.), we must be aware of the comparative importance of organizations when it comes to leadership, cohesion, and values. In a very real sense, the problem before us is one that is receiving significant attention in organizations throughout the world. For example, the field of management has been concerned with the relationship between cohesion and productivity. The debate between Japanese and American management essentially asks how companies in the two countries develop relevant leadership, cohesion, and values among the working force. The literature is clear on the point that those companies which are successful in developing a cohesive force win the battle of productivity and profits. Within military organizations, it is appropriate to argue that units which develop a sense of cohesion will be a more effective force. When viewed from this perspective, the measurement of our concepts must be connected to the organizational dynamics of the military. Put another way, we must pay attention to the linkage of the individual and groups to the structure of the organization. Thus although our primary concern is with measurement, we must begin with a consideration of leadership, values, and cohesion from a comparative organizational point of view.

The first part of the our report examines the importance of organizational structure and how it may affect our major concepts. By organizational structure we mean the major format on which organizations depend in order to accomplish their task. For example, the literature shows that Japanese management utilizes a combination of market-place standards and institutional perks in order to bring about positive cohesion which produces excellent products. In addition to pay, companies developed the idea of life-time employment, the combination of workplace and residence, and informal activities by employees after hours. In management terminology, a company is said to have a significant corporate culture when members participate fully in the environment of the enterprise. Theoretically, the Japanese believe that this kind of format generates cohesion and increases productivity. In contrast, traditional American management has operated on a market-place standard type of format. This format is grounded in the belief that remuneration is the most important variable in the production of the organizational goal, usually productivity. This same kind of debate evolved over military organizations in the form of the institutional/occupational literature. For example, what is called the institutional format in the literature on military organizations is the analog of corporate culture within the management literature. It is important to understand that the basic

problem, whether within military or civilian organizations, is the same: the creation of cohesion for a particular outcome. What is especially interesting about the military debate is that at a time when civilian firms were giving praise to the Japanese format (which is really the old military format before the All-Volunteer Force), the military has moved toward the importance of market-place standards for recruitment and retention; inherent in this position is the idea that remuneration will also produce results which are desired. While such issues are not the central concern of our effort, and we do not intend to solve or enter into the debate per se, they must be considered, since individuals operate within different kinds of organizational formats. There is no doubt, however, that structural forms of organizations have an impact on the processes of leadership, values, and cohesion.

The second part of the report is concerned with integrating what we refer to as context specific and context free research on cohesion in groups. This section utilizes a broad conceptualization of cohesion in Army units and relates it to more traditional areas of organizational research. Such an approach allows us to build a model of organizational synergy: how the acts of individuals and groups create an effect which cannot be generated individually. Variables which are seen as important in affecting organizational synergy are peer cohesion, hierarchical cohesion, leadership, and organizational commitment. We argue that the use of an organizational synergy model does not confuse the definition of cohesiveness with other related concepts such as group dynamics, leadership, and organizational commitment. We also do not assume concomitant variation between cohesiveness and positive direction of effort by the group or unit. We do, however, assume a positive direction orientation of the leader and do not deal with the fact that it is quite possible for an organizational leader not to be supportive of the organizational purpose. Thus, in an unit it is possible for linkages to leaders to be so positive that leadership variable operate so that group members expend efforts in an organizationally dysfunctional manner. But we suggest such situations are relatively rare. Therefore, we are fairly comfortable with our assumed congruence between the leader's goals and those of the organization. We conclude this section by examining implications for our findings on the operation of organizations.

The third section further extends problems of conceptualization of cohesion, with a special consideration given to problems of measurement. As such, our first task is to present indicators of cohesion. These indicators are attraction to peers, leader-subordinate relationships and group-organization goal consistency. We then develop concepts, along with how they are measured as variables, which serve as excellent predictors or determinants of cohesion. The first set of predictors are organizational variables. They include climate, communication and control. The second set of predictors are individual variables which include level of values and demographic characteristics. Group variables represent the third set of predictors. Included in this component are homogeneity of values, demographic similarity, participative decision-making, internal competition, shared successful experience, unit identification, adversity (initiation), leadership (role model, concern, power and benevolence), and competition. The fourth predictors represent a task oriented effect. They include type of task or work and physical proximity of work group members. Finally, we include policy variables. They are rotation or replacement, equipment and resources, housing policy, benefits and dependents' support and contrast in QOL between enlistees and officers. Such an approach allows us to bring together a number of concerns which have appeared in the literature into one theoretical model. As we proceed, we partition variables and note how they should predict a given aspect of cohesion. The last part of this section present a number of designs and analysis issues that are likely to be confronted when one tackles issues of cohesion within organizations.

As we proceed with our task, we give some consideration to the conceptualization of cohesion, leadership, and values which has been developed by scholars at the Army Research Institute.

## SECTION ONE

### COHESION, LEADERSHIP, AND VALUES: THE PROBLEM IN COMPARATIVE ORGANIZATIONS

The problem before us demands that we consider lessons from the theoretical and practical traditions of organizations in general. Put another way, issues of leadership, values, and cohesion have occupied center stage within organizations and organizational literature for decades. The central question has always been how to get groups who perform within organizations to produce a desired outcome. In organizations of enterprise, the desired outcome is an increase in productivity and the bottom monetary line. In military organizations the desired outcome is an effective fighting and support force. Although literature on these two organizations appear as separate theoretical and empirical traditions, the basic problem is the same. A fact overlooked by many is that the solution of the problem, which essentially is one of management, had its beginning with military institutions and was then transferred to the civilian section. Thus we must begin with military institutions and then move to comparative issues within the civilian sector.

The Spanish American War represented a crisis in leadership and cohesion for the American military. Military historians refer to the war as a managerial fiasco (Coates and Pellegrin, 1965). With the creation of the Military General Staff in 1903, the military began to seek ways to develop a "scientific" approach to management. It was also during this time period that Frederick W. Taylor was experimenting with ideas of "scientific" management in production shops. As early as 1909, well before the idea of scientific management attracted managers in the industrial sector, Taylors' ideas were introduced in the Army ordnance arsenal at Watertown, Massachusetts. Later, in 1911, he published his influential book entitled The Principles of Scientific Management. (Taylor, 1911).

The major thrust of Taylor's managerial approach to organization revolved around a complete division of labor and the primacy of specialist. Some specialists were managers who were taught the scientific way of management. More importantly, specialists on the production line, or ordinary workers, could become managers themselves once they learned the system of scientific management. Taylor's system required little direct supervision because everyone was expected to know their task well. In a real sense, the organization would manage itself. This approach assumed that people in organizations would behave like machines; there would be no need to pay attention to systems of informal organizations, feelings, emotions, values and other human traits in order to develop an organization which was efficient. One did, however, have to develop human engineering. This was the process of fitting people to machines in order to increase productivity and increase the bottom monetary line.

The concept of human engineering was the key in Taylor's work which influenced military organizations. Already having a strict command structure which was bound by tradition, the American military concentrated on fitting the soldier to the weapon. Weapons systems were seen as being tailored to the physical and psychological limitations of soldiers (Coates and Pellegrin, 1965). An excellent article entitled "Scientific Management Invades the Armed Forces" (Williams, 1955) captures the application of Taylor's work to military organizations.

As the principles of scientific management were applied to military organizations, there was a tension between the human engineering approach and the reality of the mission of the military. In Men Against Fire (1947), Marshall essentially noted that there were inherent

fallacies in the human engineering approach. Although the final goal of military operations has always been, for example, success in combat, combat soldiers in fact may take a negative view of the human engineering approach. A quotation from Marshall's work captures this tension:

A great note of smugness was not missing from the remark all too frequently heard during World War II: "We go at this thing just like it was a great engineering job." What was usually overlooked was that to the men who were present at the pay off, it wasn't an engineering job, and had they gone about their duty in that spirit, there would have been no victory for our side. (p. 210)

This quotation captures that fact that certain principles of scientific management overlooked the importance of variables such as leadership, cohesion, values, emotions, and feelings. Important work such as the Western Electric Hawthorne (Mayo, 1933) experiments of the late 1920's brought about the importance of the human relations approach to management within the civilian sector, and an increased awareness of the importance of cohesion and values for organizations within the civilian sector. There was a similar effect for military organizations due to the work done by Stouffer and associates and reported in The American Soldier (1949). They reported that both officers and enlisted men in combat units related to leaders who led by example better than they did to those who directed operations from the rear. In addition to more of an emphasis placed on the human aspects of soldiering, the military began to concentrate on the importance of leadership. There was also a change in the pattern of organizational authority. As Janowitz noted his work The Professional Soldier (1960) there was a shift from authoritarian domination to a reliance on manipulation, persuasion, and group consensus within military organizations. This meant that officers would have to be trained in management theory. The emphasis on leadership, which is addressed later in this report, began to flourish within military institutions. Also, research on leadership received a new emphasis among scholars of military institutions. (Lewin, Lippit, and White, 1939; McGrath and Altman, 1966; Medland and Olans, 1964; Wood, Nealey, and Thornton, 1975; Buck and Korb, 1981).

The changing pattern of management noted by Janowitz in 1960 marked the beginning of a scholarly tradition which was concerned with bringing military and civilian organizations into one overall framework for analysis. The theoretical workhorse of this effort became known as the convergent/divergent theory of organizations. It is concerned with the extent to which organizational similarities and differences occur between military and civilian structures. Empirical indicators of the convergence/divergence thesis include the differences in required skills for those in civilian and military occupations and trends in methods of leadership. Following the original ideas of Janowitz, empirical research indicates that the military shows a convergence with the civilian sector vis-a-vis the use of managerial rational techniques. In terms of trends in skills, the general conclusion is that some structures of the military will be convergent with those in the civilian sector (i.e., technical, administrative, and clerical units) and others will be divergent (i.e., combat units). (Segal, Blair and Stephens, 1979; Moskos, 1970). This basic conclusion remained intact for research on convergence/divergence from the late 1960's to the creation of the All-Volunteer Military in the early 1970's.

The development of the All-Volunteer Force created new questions for students of military organizations. Research on military organizations before this landmark change operated within a traditional "closed" military setting. Although research had shown that there was some degree of convergence between civil and military organizations, the switch from a military based on the draft to one based on volunteers meant that convergence would take on additional significance. More importantly, the switch would be viewed as a



structural change which would have implications for important organizational components such as cohesion, leadership, and values. Instead of concentrating on measuring subtle changes of convergence or divergence, the creation of the All-Volunteer Force called for a new theoretical conceptualization of the civilian-military interface. It was into this theoretical vacuum that Moskos (1977, 1978) stepped and developed the institutional/occupational model.

Moskos chose the concepts of institution vs occupation in order to capture changes in military organizations given the development of the All-Volunteer Force. It is important to understand that Moskos' analysis is structural and is not based on individuals as the unit of analysis. Put differently, structural features associated with either format exert a certain force on individuals and reflect different values of the organization. These structural features should by definition affect cohesion and leadership. Recognizing that his concepts represent ideal types which are not necessarily mutually exclusive, Moskos developed their operational definitions. An institution is legitimated by values and norms which transcend individual self-interest in favor of a presumed higher good. Because of ideas of self-sacrifice and primary identification with one's role, individuals view themselves as somewhat different than individuals in other kinds of organizations. Although remuneration is much less than the market place would bring, an array of institutional benefits provide additional compensation as well as "psychic" income. Features or components associated with this type of military organizational format include extended tours abroad, fixed terms of enlistment, liability for 24-hour service, inability to resign, strike, or negotiate working conditions, subsidized base facilities, and remuneration which is based on rank, seniority, and need. On the other hand, an occupation receives its legitimacy in terms of the market-place. There is an emphasis on prevailing monetary rewards for equivalent competencies. Features associated with this format include a negotiation between individual and organizational needs because of the cash-work nexus, a priority of self-interest rather than that of the employing organization, trade unionism, and separation of work place and residence. Using developmental analysis, which allows one to project organizational forms in the future based on the construction of a pure type, Moskos shows that the logic which created the All-Volunteer force (market-place standards) had the effect of switching the military from an institutional to an occupational format.

Central to Moskos' idea is the fact that if one changes certain structural features of an organization, then individuals will respond in predictable ways. Thus his features which are outlined above as relating to the two formats are structural variables. Therefore, under an organizational format where the cash-nexus basis is legitimated, one should expect individuals within the organization to begin to concentrate on increasing their pay and individual situation. Military unions, for example, become a possible vehicle to reach that goal. Likewise, if one separates the workplace from the place of residence, military personnel will react by becoming like their civilian counterparts--arriving late to work and leaving early in the afternoon rush hour. These kinds of organizational changes create problems in leadership, values and cohesion. For example, the Master Sergeant becomes simply a shift boss; this creates a crisis in leadership for that rank. The ability to build cohesive units declines because personnel, especially at the enlisted ranks, do not have the opportunity to interact with each other during off-duty hours. The base bowling alley and clubs would no longer play a significant role in bringing people together after hours. Close personal feelings generated by members of the organizations become difficult to create and maintain. Although it is not our intention to address this problem systematically, the important point is that the structure of the military exerts a significant effect on leadership, cohesion and values.

As the military organizations began to rely on market-place standards to recruit and retain members, ironically the civilian sector began to move somewhat in a different direction. For decades civilian firms had depended on market-place standards for the recruitment and retention of personnel. The workplace was seen as something where cohesion was not related to the final goal of the organization. Managers were simply plunged into an organization as experts in their chosen fields. There was a primacy on the total separation of workplace, residence, and informal activities. In short, Moskos' occupational format represented the nature of civilian firms.

In 1981 a work appeared which was the result of "new" research in the field of management which had been on-going for about ten years. The book, Theory Z (Ouchi, 1981), essentially argued that American management techniques contain a basic flaw which inhibits the production of excellent products and thus depresses the ability to be competitive. American organizational formats within the business sector were viewed as not contributing to the development of cohesion. The subtitle of the work is "How American Business Can Meet The Japanese Challenge." Ironically, the basic thesis of Theory Z can be grounded directly in what Moskos' calls the institutional format. Consider the following quotation from Ouchi's work:

In the contemporary American mind, there is apparently the idea that intimacy should only be supplied from certain sources. The church, the family, and other traditional institutions are the only legitimate sources of intimacy. We [Americans] resist the idea that there can or should be a close familiarity with people in the workplace. 'Personal feelings have no place at work,' is the common feeling. Yet we are faced with an anomaly. In the Japanese example, we find a successful industrial society in which intimacy occurs in the place of work as well as in other settings. The Japanese example forces us to reconsider our deeply-held beliefs about the proper sources of intimacy in society. (pp. 8-9)

Although Ouchi utilizes the concept of intimacy rather than cohesion, the basic idea is the same. In order to produce and increase profits, there should be a basic bonding between individuals in industrial organizations. The concept of "Corporate Culture" was developed in order to capture the atmosphere of business organizations which attained a degree of cohesion in the workplace. But this concept is simply another term for Moskos' institutional format.

Because Theory Z can be grounded in the institutional format, it is not surprising that the theory concentrated on the structure of Japanese and American business organizations. Under the Japanese model, or the institutional format, there is emphasis placed on the combination of workplace and residence. When this is not possible, employees engage in informal activities (jogging, exercise, etc.) in order to generate a sense of cohesion and togetherness. There is also an emphasis on promoting through the ranks, teamwork and collective action, and providing institutional perks which are not in cash form. In a major research effort, reported in a book entitled The Art of Japanese Management (Pascale and Athos, 1981), it was demonstrated that American companies who operated under the Japanese structure (or in military lingo, the institutional) were very successful. For example, IBM and Delta Airlines have experienced little turnover, provide lifetime employment, provide structural support for informal activities, promote from within, and as a result generate a great deal of cohesion within their companies.

As we began our task on cohesion, leadership, and values, we were aware that one must give consideration to organizational structure. The purpose of this introduction has

been to make individuals aware of the importance of structure for the generation of cohesion. We now move to our major task, the measurement of cohesion, leadership and values.

## SECTION TWO

### SYNERGY IN AN ORGANIZATION UNDER STRESS: THE ARMY UNIT IN COMBAT

Were there to be a war between the major Eastern and Western powers today or in the foreseeable future, the battlefield that U.S. Army units would have to face would be one of enormous destruction, resulting in great confusion and high levels of fear among all those involved. The Army has developed several scenarios which attempt to look ahead to the year 2000 and beyond and to portray what the battlefield would be expected to look like in a major confrontation in Central Europe between NATO and Warsaw Pact forces (Hunt & Blair, 1985).

In these scenarios, conventional weapons have become far more lethal, and the possibility of chemical and tactical nuclear warfare is very real. Electronic warfare could make communication between units in the field and their commanders at headquarters impossible. Even attempts to communicate may result in destruction from weapons systems that lock onto radio signals. Because of night fighting capabilities, soldiers may be called upon to fight continually with little or no rest. Rear areas, normally secure, are likely to be attacked effectively due to unclear battlelines with both sides operating behind each other's lines with substantial forces (Jacobs, 1985).

In outline form, these are some of the key characteristics which make today's and tomorrow's battlefield highly stressful for units that must somehow avoid disintegration and continue to function (Shils & Janowitz, 1948). An understanding of these key characteristics is critical for current and future planning by the managers of this public sector organization which has a unique public mission. So, too, is an understanding of their implications for soldiers, and their commanders who must lead them and manage their activities and resources, and for Army organizations which must be designed and structured to function under these turbulent and stressful circumstances.

In this section we will look at the problem of the continued functioning of organizations under stress. To do so, we will look both at what Blair and Hunt (1986) have called the "context specific" literature on the specific context of military organizations as well as the "context free" knowledge base that has been developed on organizational behavior and design-free of any particular organizational context. In so doing, we will develop a synthesis of the two literatures. We hope that this new approach will be more useful than either one alone as we try to understand those factors that would allow individuals, groups, and organizations to withstand intensive environmental stress and turbulence.

The managerial challenge for the Army's leaders is substantial. The Army unit in combat represents the high end of virtually any continuum or other conceptualization that looks at organizations under stress and turbulence. We hope that this paper will contribute to our understanding of such highly stressed organizations and their managerial challenges. We will first look at the current approach in the military organization literature which has focused on the notion of *cohesion*. Then we will modify a concept from the context free group dynamics literature and call it *organizational synergy*. Next, we will examine the variables affecting organizational synergy. Finally, we will discuss the theoretical and managerial implications of our approach.

## THE COHESION APPROACH

A careful review of the literature on *group cohesion* produces a wide variety of definitions and concepts, ranging from very broad to very narrow. A broad, inclusive definition was put forth in a special study done at the National Defense University.

...we define military cohesion as the bonding together of members of a unit or organization in such a way as to sustain their will and commitment to each other, their unit, and the mission. (Johns *et al.*, 1984; Henderson, 1985)

Building on the existing broad view, Siebold (1987) has conceptualized cohesion as consisting of two dimensions (affective and instrumental) at three levels: horizontal (peer), vertical (soldiers and the leader), and organizational (soldiers with their units and the Army).

Walker, Guest, and Turner (1968) took a midrange view--the resistant power of a group to think and act as a single unit in pursuit of a common objective. The notion of efficiency toward the accomplishment of a goal is introduced. However, nothing is said in this approach as to whether or not the "goal" is necessarily congruent with the goal of the larger organization, i.e., the directionality of the effort may or may not be consistent with organizational objectives.

Other definitions tend toward the narrow version.

One group may differ from another group in the extent to which there are forces acting on the members on each group to remain a member. It may not matter much to an individual whether he remains a member of group A, but it may be very important to him not to be excluded from group B. We shall call the total field of forces which act on members to regain in the group the "cohesiveness" of that group. (Festinger, Schacter, and Bach, 1950)

...that group property which is inferred from the number and strength of mutual positive attitudes among member of a group. (Lott and Lott, 1961)

"...a basic bond or uniting force in a group." (Piper *et al.*, 1983)

The most definitive, restrictive definition has been put forth by Etzioni: "By *cohesion* we mean a *positive expressive relationship* among two or more actors" (1975: 280). Etzioni assumes that a cohesive relationship is "one in which the actors have positive emotional investment in each other and that these investments...are governed by norms" (1975: 280). He goes on to point out that his definition does not imply shared goals or values. He carefully avoids doing so because:

To define cohesion as referring both to social integration or solidarity and to consensus or normative integration blurs a valuable distinction. This broader usage turns the concept from a definition into a proposition which is *assumed* to be valid--that is, that solidarity and normative integration are positively associated and change in an associated way. (1975: 280)

Also Etzioni appears to be the first (his 1975 book was first published in 1961) to draw the distinction between "peer cohesion" and "hierarchical cohesion." The first referred to cohesion among actors of the same rank and the second to a bond which linked actors of

different ranks. Peer cohesion alone, Etzioni argues, is not sufficient to direct the effort of the group to the organizational goal. It often takes hierarchical cohesion to link group effort to the organizational objective: "...commitment to the leaders often means commitment to their norms or the norms they represent--that is, those of the organization." (Etzioni, 1975: 292)

The question of whether a narrow or broad view of cohesiveness is most useful in understanding that phenomenon which would help organizations (and their members) resist disintegration is obviously important in both conceptualization and operationalization. Thus, our first task is to decide on the "most useful" definition for the problem at hand. To aid in the decision, we return to the seminal article on military cohesion in order to discern the reason that led armed forces researchers to adopt the broad view. The key article is the classic study by Shils and Janowitz (1948) entitled, "Cohesion and Disintegration in the *Wehrmacht* in War World II." Although the authors do not define *cohesion* as a specific term in their analysis, one can infer a definition through their hypotheses and through their discussion of factors affecting "a cohesive force." Evidently, their concept of cohesion is strongly anchored in the concept of "primary group solidarity." Further, solidarity is based upon several factors as suggested by their first hypothesis in which they argue that a soldier's ability to resist is:

...a function of the capacity of his immediate primary group (his squad or section) to avoid social disintegration. When the individual's immediate group, and its supporting formations, met his basic organic needs, offered him affection and esteem from both officers and comrades, supplied him with a sense of power and adequately regulated his relations with authority, the element of self-concern in battle, which would lead to disruption of the effective functioning of his primary group, was minimized. (Shils and Janowitz, 1948: 178)

The Shils and Janowitz formulation goes considerably beyond the narrow definition of cohesiveness in at least two ways. First, it incorporates the notion of both instrumental as well as affective components. This is consistent with Siebold (1987), and in contrast to Piper *et al.* (1983) which expressly avoids an instrumental component. Second, it includes a role for the leader.

However, it still does not coincide with the current, broad definition adopted by recent military researchers (e.g., Henderson, 1985). Further, in a second classical work which was based upon participant observation of American soldiers in Korea, "Buddy Relations and Combat Performance," by Little (1964), there seems to be a rather cogent argument concerning the danger of overextending the notion of primary groups which is at the core of the group cohesion notion.

Even in the smallest unit there is an "iron framework" of organization which serves as a basis of social control. However, the contribution of these research findings to military primary groups has often been overinterpreted and overextended to the point of creating a "human relations" theory of organization which fails to give sufficient emphasis to authority, power structure, the environmental context, and organizational goals sufficient scope.

Little goes on to state,

Thus, primary group cohesion *per se* does not account for organizational performance; to the contrary, the loyalties of primary groups and the need to maintain them can develop into a basis of opposition to the larger organization. (p. 192)

For the reasons outlined by Etzioni (1975) and Little (1969), we suggest the adoption of the narrow definition of cohesion. Indeed, the broad definitions seem to assume that cohesion in primary groups leads to a positive direction of effort as well as an identification with the larger organization. Indeed, there is remarkable agreement in the literature that small group cohesion may work in either direction, i.e., either in support of or in opposition to organizational goals.

But, surely, the context specific researchers of military organizations are familiar with previous findings from both military and civilian organizations. Thus, one might infer they adopted the broad definition in order to restrict the phenomena under their particular study only to "positive" or "functional" cohesiveness. However, even though they restrict cohesion to its positive aspects, their broad definition incorporates several other constructs under the *cohesiveness* term which are not traditionally thought of as cohesion.

At first blush, such an expanded notion appears unwise. However, when one examines the broad definition, not as a definition *per se*, but as a composite construct, then the idea of broadening the cohesion concept may well perform a service. That is there is something to be said about examining the notions of peer cohesiveness, leader impact, and organizational influence simultaneously. In other words, the inferred purpose of the broad definition may well be a worthy goal, indeed. However, a broader, composite construct probably ought to contain the narrow definition of cohesiveness along with the other major variables in their more traditional incarnation, so as to provide a better basis upon which to integrate previous theory and empirical findings, especially those that come from the context free literature.

Specifically, we suggest that Etzioni's *peer cohesion* is approximately equal to the broad definition's "horizontal cohesion" and his *hierarchical cohesion* approximates "vertical cohesion" which, in turn includes a similar class of variables commonly grouped under the *leadership* rubric. (Etzioni seems to use *hierarchical cohesion* and *leadership* interchangeably.) Finally, Siebold's *bonding with the unit and the Army*, might well be approximated by the construct of *organizational commitment*. Thus, the triad of the individual's linkages to the group, the leader and the organization may be depicted as in Figure 1.

Figure 1: Individual Linkages

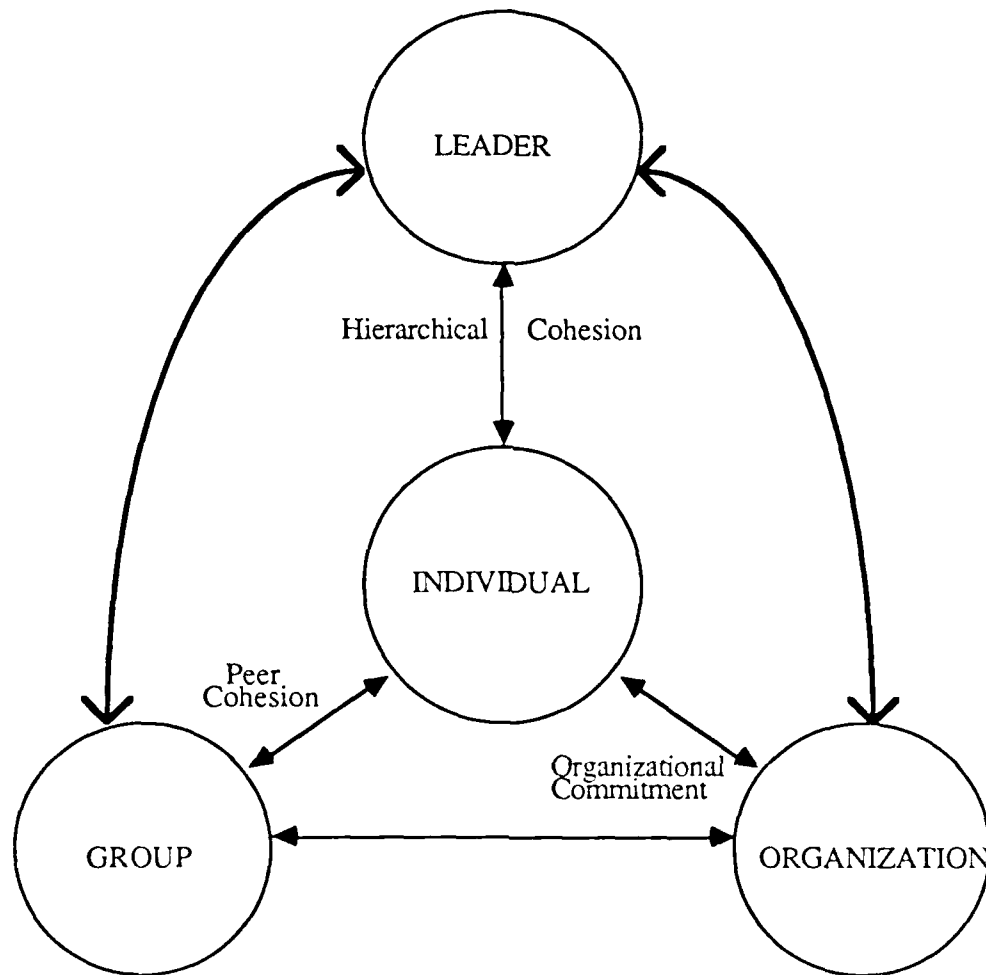


Figure 1 is an attempt to portray the potential key linkages between an individual and organizational components. It tends toward an "ideal state". We realize, of course, an individual may be a member of an organization with none of the linkages depicted or with only one or two or, indeed, with all three. Further, the individual to group linkage (peer cohesion) in no way suggests acceptance of the purpose of the larger organization, whether a specific work unit or the entire organization is considered as the entity.

Before considering the dimensions of the three linkages, we need to recognize the importance of individual variables involved in all three processes. That is, what an individual brings to the situation can be a very important consideration affecting the linkage process. It is not our purpose, however, to dwell on individual variables. We simply wish to acknowledge the role such variables can have. Consider, for example, the body of literature on interpersonal attraction and peer cohesiveness (e.g., Lott and Lott, 1961) or individual variables and leader legitimation (e.g., Stogdill, 1974) or on the importance of intelligence to effective group performance (e.g., Scribner *et al.*, 1985). Finally, in this brief review of the literature, a particular contribution is worthy of note concerning an individual's propensity to become committed to an organization. Stephen Wesbrook



(1980) found evidence that a high degree of sociopolitical alienation "almost ensures" individuals will possess low morale and a lack of willingness to support the organizational norms. A full discussion of individual variables as well as the other determinants of the components of the model is contained in Section Three.

Returning for a moment to the broader definition (Siebold, 1987), we need to address his two postulated dimensions of: *instrumental* and *affective*. The literature appears to us to be split. Some theorists restrict the peer cohesion process to an affective component only (Etzioni, 1975; Lott and Lott, 1961). Yet others clearly portray the instrumental dimension (Shils and Janowitz, 1948; Henderson, 1985). However, even if one adopted the single affective dimension we are still faced with a temporal problem to the degree that the instrumentality of group members leads to the development of or increase in the affective component. Further, a case can be made for a multidimensional view of cohesion. The Piper *et al.* (1983) is a case in point. After completing a factor analysis of their measurement instrument, they concluded:

The results indicate that participants of small groups employ several different concepts to organize their experience with the other participants, the leader, and the group as a whole. On the one hand, the results may be taken to support a multidimensional view of cohesion....On the other hand, the results may be taken to differentiate a circumscribed definition of cohesion from several other concepts (1983: 103).

They went on to suggest a limited definition of cohesion consisting only of an affective component. However, they then noted if such were the case, other dimensions will have to be added to explain member-group attraction. Thus, we are left with the idea that *peer cohesion* is either a single dimensional concept or a multidimensional concept that may go beyond "affective and instrumental". We suggest the latter.

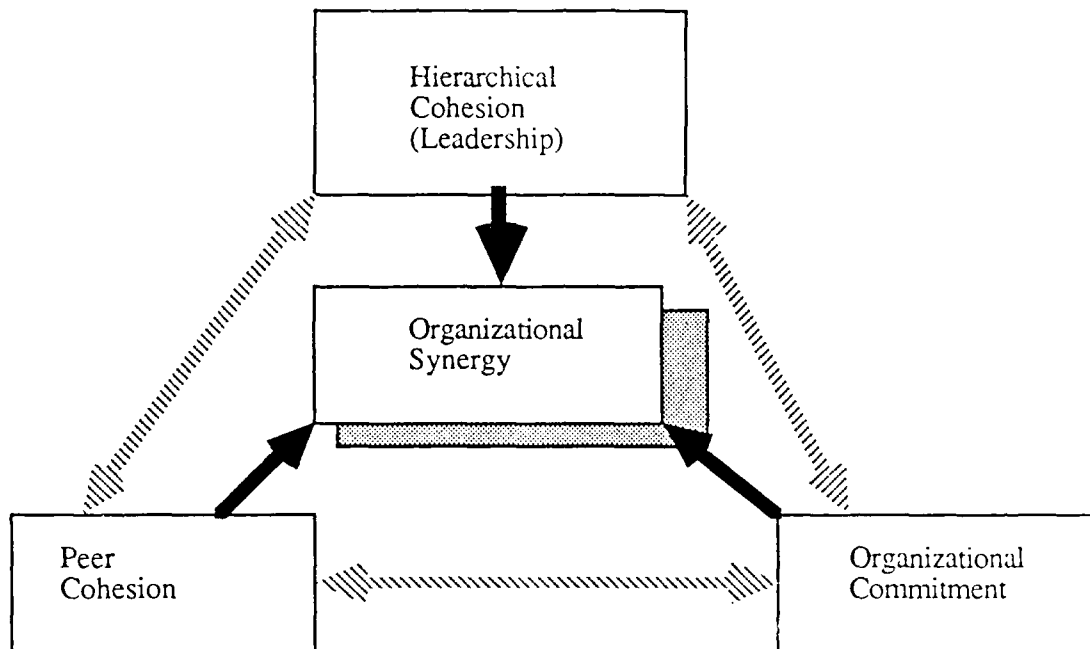
When we examine *hierarchical cohesion* ("vertical bonding" of the broad definition), the two dimensions of "affective and instrumental" can be made to fit. However, there may be more dimensions involved. First, Etzioni's concept of *hierarchical cohesion* itself may have more than one component. Etzioni (1975) cites a study by Lehman who made a distinction between formal and informal hierarchical cohesion. Then there could well be several other dimensions if one expands the concept to look at leadership more generally: instrumental, participative, supportive, achievement oriented (House & Mitchell, 1974); contingent reward, management by exception, intellectual stimulation, individualized consideration, charisma (Bass, 1985). As in the case of *peer cohesion*, *hierarchical cohesion* can be restricted to a single affective dimension or expanded to several dimensions. Again, we suggest the latter.

Finally, when examining the linkage between the individual and the organization, *organizational commitment*, we find a similar situation. There is a relatively narrow definition that one might call affective or expressive: "An attitude or an orientation toward the organization which links or attaches the identity of the person to the organization" (Sheldon, 1971). Conversely, there are broad definitions implying several dimensions, such as: "The process by which the goals of the organization and those of the individual become increasingly integrated or congruent" (Hall, Schneider, & Nygren, 1970).

## ORGANIZATIONAL SYNERGY: A POSITIVE VIEWPOINT

If we adopt the "spirit" of the broad definition of cohesion and realign the three linkages in a way that is commensurate with the traditional literature (both context free and context specific), then we might arrive at the three factors depicted in the model found in Figure 2.

Figure 2: Organizational Synergy



But to make the model complete we were required to consider still another phenomenon not addressed by the broad cohesion literature but implied by it: *organizational synergy*. The concept of synergy has been widely discussed in the group dynamics literature, but here we are extending it to the organizational level, in this case the Army unit, which may involve multiple small groups along with a formal leadership structure several levels high.

Keep in mind, the representation in Figure 2 approximates an ideal state with respect to individual linkages. The positive interaction among the three organizational phenomena and their effect on individual motivation represents a goal to be obtained. Such a formulation, we believe, exploits the intended usefulness of the broad definition of cohesiveness (e.g., Henderson, 1985; Siebold, 1987) which focuses on a higher level phenomenon which is perceived to energize and enhance the performance of an unit or to prevent its disintegration under fire. *Organizational synergy* more adequately reflects this notion, in our opinion. The synergy formulation simultaneously avoids the alleged pitfalls pointed out by Etzioni (1975) and Little (1969) of using cohesiveness as a broad definition. We might note, that even though the new formulation we are suggesting is broad, the important concepts bridge the gaps to the known literature.

Specifically, the use of *organizational synergy* for this broad concept also does not further confuse the definition of cohesiveness with that of other concepts (group dynamics in general, leadership and organizational commitment). We also do not assume concomitant variation between cohesiveness and positive direction of effort by the group or unit. We do, however, assume a positive orientation of the leader. That is, it is quite possible for an organizational leader not to be supportive of the organizational purpose. Thus, in an unit it is possible for linkages to leaders to be so strong that group members expend efforts for the leader but in an organizationally dysfunctional manner. But we suggest that such situations are relatively rare. Therefore, we are fairly comfortable with our assumed congruence between the leader's goals and those of the organization.

The model further suggests possible interactions among the phenomena themselves. That is, to the extent that influential group members have regard for the leader, the greater the peer cohesion, the greater the hierarchical cohesion. The same could be true in reverse. For example, a strong, influential leader could act as a catalyst for increasing peer as well as hierarchical cohesion and, thereby, induce greater intra-group cooperation and cohesion.

Aside from the "reconfiguration" of the broad definition of cohesiveness to that of organizational synergy, the failure to adopt the two-dimensional linkage mechanism (affective and instrumental), and the acknowledgement that peer cohesion can be bidirectional, there is another significant difference between our organizational synergy model and the broad definition. Specifically, we suggest there can be effective work groups or military units without all three factors operating. One factor may compensate for the lack of another factor. In other words, it is quite possible to have functional units with very low degrees of peer cohesion but with high degrees of hierarchical cohesion and organizational commitment; or, units with high peer cohesion and high organizational commitment with very low amounts of hierarchical cohesion. Further, organizational commitment must include agreement with the organization's purpose, even if one dislikes the organization itself. To illustrate this point, consider the U.S. Army's deployment in World War II, Korea, and Vietnam.

Shortly after World War II, researchers were reporting the importance of cohesion on the ability of Army units to fight and to withstand the rigors of battle (Stouffer *et al.*, 1949; Marshall, 1947). Basically, what Shils and Janowitz (1948) observed in their study of the German Army was the tremendous tenacity of small German Army units even at the end of the war. As indicated earlier, the majority of the variance in ability to resist was attributed by Shils and Janowitz to primary group solidarity rather than to any notions of "national purpose". Based upon the Shils and Janowitz observations, peer cohesion would be considered to be very high, hierarchical cohesion was observed to a marked degree; but, identification with the larger organization or belief in the larger purpose of the "war" was absent or at most a minor factor.

Little observed that "buddy relationships" were the basic element of social organization among combat units in Korea, resulting in a "molecular or granular type of primary group" (1969: 198). He too, found little explanation of combat motivation through commitment to the larger organization or agreement with national purpose; but, he did find an important role played by the leader.

On the other hand, Moskos (1970), living with American soldiers in Vietnam, found that earlier assumptions deemphasizing the salience of ideological considerations ought to be reexamined.

...rather than conceiving the ideological and primary-group explanations as mutually exclusive, our knowledge of combat motivation must be informed

by an awareness of the manner in which both of these considerations are interrelated....the individual behavior and small-group processes occurring in combat squads operate within a widespread attitudinal context of underlying value commitments; most notably, an anti-political outlook coupled with a belief in the worthwhileness of American society. (p. 155-156)

Moskos went on to describe a fundamental belief among the individual soldiers in the purpose of the American Army in Vietnam despite the soldier's profound skepticism of political appeals.

Another very interesting point made by Moskos is the utilitarian nature of peer cohesiveness, which is also present to an extent in Little's writing. Moskos states,

...under the extreme conditions of ground warfare, an individual's survival is directly related to the support--moral, physical, and technical--he can expect from his fellow soldiers (1970: 145).

Little observed,

The primary basis for solidarity in the platoon and company was the recognition of mutual risk. A set of norms so regulated their behavior as to minimize that risk. (1969: 219)

Finally, again reviewing the Shils and Janowitz article, one cannot help but be struck by the isolation and interdependence of the German soldiers. We must raise the question of whether hierarchical cohesion and a degree of organizational commitment do not combine with the extreme situation to foster a high degree of peer cohesion.

Our fundamental point is simply that when one finds all three factors of the model operating in concert, then organizational synergy should be at a maximum, even perhaps to some exponential power. However, the three factors of leadership, group dynamics and organizational commitment may enhance and/or substitute for each other. Furthermore, the extent of organizational synergy will modulate organizational conditions in an analogous manner to Hackman's (1987) group synergy (see Figure 3).

**Figure 3: The Interaction of Synergy and Condition**

		Organizational Condition	
		Combat	Training
Organizational Synergy	Low	Amplification of the impact of adverse conditions on the organization, group and individual	Failure by the organization, group and individual to exploit opportunities in the training situation
	High	Damping of the negative impact of adverse conditions; possible full exploitation of tactical opportunities	Full exploitation of training conditions

Figure 3 is not only designed to portray the interaction effects between organizational synergy and organizational condition, but also is designed to acknowledge the extreme differences in organizational condition: combat and training. Actually, there can be a third condition for military units which can only fully realize their fundamental purpose in battle but can more or less simulate that purpose during training. These other functions may have nothing to do with the organizational purpose, e.g., some members of a Tank Company performing Post housekeeping chores, which are often done in a garrison situation. By *training* in Figure 3, we mean training related to the purpose of the immediate organization and involving the other members of the organization.

Even though training is designed to simulate combat to some extent, from our review of the literature, we suggest three fundamental dimensions which differentiate training and combat: the degree of risk, deprivation, and isolation (Shils and Janowitz, 1948; Little, 1969; Moskos, 1970; George, 1971). Thus, to the extent that the organization can increase the degree of the above three factors, the greater the simulation to the combat role. Of course, the most difficult to simulate is risk; however, apprehension factors might be

increased by competition or evaluation meaningful in the eyes of the unit members. Isolation might be achieved through extensive field training (long periods of time) away from the base area which, incidentally, would increase the degree of deprivation. However, in no way can any simulation come close to actual combat conditions due to the absence of increased threat of death or dismemberment.

The damping of the negative impact of combat conditions was probably best illustrated by the Shils and Janowitz (1948) study of the German Army. We could not find any accounts in recent history that would parallel the risk, isolation, and deprivation experienced by German soldiers at the close of World War II. (We are sure there were situations equally as desperate, but simply did not have observers to relate the facts.) American soldiers in World War II, for the most part, had reasonably decent information from home through mail service and publications. Further, the logistics situation of the Allies was in much better shape than that of the Germans, thus minimizing the probability of extensive deprivation of food and ammunition. Perhaps the opposite extreme of soldiers in combat was in Vietnam where there was very little isolation or deprivation. Only on relatively short operations were soldiers away from fire support bases and thus, away from electronic news, prepared food, and the larger unit. This might account, in part, for the small degree of peer cohesiveness observed by Moskos (1970). Quite possibly, as indicated earlier, peer cohesiveness forms in situations where it is required, given the proper conditions. In other words, it may be quite impossible to create conditions of extremely high peer cohesion in groups or units without the conditions of high risk, isolation, or deprivation. Simply stabilizing group membership does not necessarily increase unit cohesion as evidenced by comparing groups of soldiers who had been together under stabilized rotation policies to those whose members rotate on an individual basis (Siebold, 1987).

#### ORGANIZATIONAL SYNERGY: DEFINITION OF ELEMENTS AND SUGGESTED MEASUREMENT

In review, we are indebted to the broad theorists of cohesiveness (i.e., Johns, *et al*, 1984; Henderson, 1985; and Siebold, 1987) for focusing on the possibility of examining three very important phenomena in concert: peer cohesion, leadership, and organizational commitment. However, we believe that rather than adopt a broad definition of cohesion with the resultant alleged difficulties discussed above, it is better to couch the component parts in terms of the alleged traditional, context free literature. By so doing, we believe we have realized at least four advantages.

- (1) There should be many more possibilities of discovering relevant factors since one is not relegated to the context specific literature only.
- (2) Problems in the directionality of impact are avoided as we make no assumption that higher peer cohesiveness leads necessarily to increased group productivity.
- (3) The context free literature is full of suggested measures and possible determinants (see the discussion and listing in Section 3 for more on determinants).
- (4) The organizational synergy construct is recognized to have specific components that may work singly, substitute for one another, or work in concert resulting in "true" synergy.

The last notion is very important for, we believe, it allows us to account for the widely varied research findings discussed in the earlier literature review. For example, it was observed that there was little primary group bonding in units in Vietnam; yet, there was

more than a reasonable amount of combat motivation in many units (Moskos, 1979) suggesting there can be effective fighting organizations without the "classic" notion of cohesiveness. We believe that with further explanation of the organizational synergy notion, we can account for such observations. However, before proceeding with such explanation, it would probably help to present a more detailed definition of the three elements of synergy -- peer cohesion, leader influence, and organizational commitment.

#### PEER COHESION

We diverge somewhat from Etzioni (1975) by suggesting the following definition of peer cohesion:

The degree of positive, affective relationships between peer group members.

Etzioni (1975) cautions not to include in any definition the mixing of hierarchical levels. We believe that we have met his suggestion. However, Etzioni also refuses to include the term *group* in his definition because, "...this term is itself often defined as a number of actors who have a cohesive relationship...." (p. 280). Since in our discussion we focus on a group or unit as defined by organizational boundaries, we feel that the inclusion of the term *group* is both justified and desirable.

Possible measures of peer cohesion can be found in Piper *et al.* (1983) in which three factors emerged from the group measures -- mutual stimulation and affect, commitment to the group, and compatibility of the group. Of course, items would have to be carefully selected and targeted specifically to military units.

#### HIERARCHICAL COHESION AND LEADERSHIP

Quite clearly, we have equated leadership with hierarchical cohesion. Our reasons for so doing are discussed earlier. We believe that such a formulation is commensurate with the literature already cited and fits well with the organizational synergy conceptualization. Thus, we believe that the evolutionary study of leadership over the last four decades is relevant. There seems to be a recurring pattern of competence and consideration that approximates the well known research findings of initiating structure and consideration. We are not suggesting the two sets of constructs are isomorphic; however, we do suggest they are close enough to recommend the proposition that military leadership is not significantly different from "civilian leadership". Indeed the evolutionary findings from path-goal theory (House and Mitchell, 1974), from leader-member exchange theory (Graen *et al.*, 1982), and from many other theorists are applicable to the organizational synergy model.

Perhaps the most efficacious formulation of hierarchical cohesion would be the wholesale adoption of the Bass (1985) model of transactional and transformational leadership. Certainly, the model is broad enough to incorporate the earlier leadership findings and has the distinct advantage of suggesting a host of additional variables not previously mentioned in the cohesiveness literature. In other words, we are subscribing to the notion that the same factors that result in effective leadership in general also result in improving hierarchical cohesion. Thus, we add the five factors of Bass (three in *transformational* and two in *transactional*).

Transactional  
Contingent Reward  
Management by  
Exception

Transformational  
Individualized Consideration  
Intellectual Stimulation  
Charisma

## ORGANIZATIONAL COMMITMENT

Ever since the highly impactful findings of Shils and Janowitz (1948) were published, many writers have suggested that the individual's linkage with the larger organization or even agreement with the organization's purpose is not an important motivational factor (see, for example, Savage and Gabriel, 1976). In their summary, Shils and Janowitz state:

The solidarity of the German Army was discovered by these studies...to be based only very indirectly and very partially on political convictions or broader ethical beliefs. Where conditions were such as to allow primary group life to function smoothly, and where the primary group developed a high degree of cohesion, morale was high and resistance effective....(1948: 216)

Little (1969) made provision for, perhaps, a greater degree of influence on American soldiers in Korea through his finding that abstract values or symbols of the larger society could be an important motivating force if such values were represented to him from persons who were of great significance, e.g., his family.

Moskos, writing about American soldiers in Vietnam, suggested such motivating influences were much more subtle than many investigators suspected.

I propose that primary groups maintain the soldier in his combat role only when he has an underlying commitment to the worth of the larger social system for which he is fighting. This commitment need not be formally articulated, nor even perhaps consciously recognized. But he must at some level accept, if not the specific purposes of the war, then at least the broader rectitude of the social system of which he is a member (1970: 147).

Alexander George (1971), in reviewing this issue basically agreed with Moskos (1970). However, George believed that Moskos' formulation was the "minimal role" of ideology in war. George went on to suggest that,

...it is clear that these factors are also capable of playing a far more important role in combat motivation. Of three hundred veterans of the Abraham Lincoln Brigade who had fought in the Spanish Civil War, seventy-seven percent stated that 'belief in war aims' had been among the most important things that had helped to overcome fear in battle (1971: 307).

In our review of the literature, we have found nothing to suggest that such variables as agreement with the organizational purpose, value congruence with perceptions of what the organization stands for, and other such notions cannot be related to individual motivation. In fact, the lack of such findings in the Shils and Janowitz study may well have been due to



the crumbling nature of the German national structure at the close of the war, the time of their data gathering. By late 1944, there may have been precious little of the larger structure left to believe in for German soldiers, other than their immediate comrades and small unit leaders. At any rate, we suggest that commitment to the larger organization will enhance the overall motivational set of the organization member.

As was the case in the review of group and leadership variables, differences in definitions with implied underlying dimensions was discovered. Typical definitions included,

A partisan, affective attachment to the goals and values of an organization, to one's role in relation to goals and values, and to the organization for its own sake, apart from its purely instrumental worth (Buchanan, 1974: 533).

An attitude or an orientation toward the organization which links or attaches the identity of the person to the organization (Sheldon, 1971: 143). *[Note: this definition presumably includes instrumental notions as well as most other dimensions.]*

Mowday, Porter, and Steers conducted an extensive literature review and propose the following definition, "...the relative strength of an individual's identification with and involvement in a particular organization" (1982: 27). They went on to list three factors that characterize organizational commitment -- acceptance of the organizational goals and values, willingness to work hard, and a strong desire to remain a member. There seems to be a logical point of convergence between context free and context specific literature concerning organizational commitment. Specifically, the widely discussed concept of Moskos' "Institutional and Occupational" models of organizations dovetails nicely with the preceding discussion (see the discussion in Johns *et al.* 1984).

#### ORGANIZATIONAL SYNERGY: AN HYPOTHESIZED EQUATION

As indicated earlier, our formulation of organizational synergy will allow us to account for the highly varied findings concerning cohesiveness and unit performance. Specifically, the notional equation, below, allows for a lot more possible outcomes than suggested by the broad definition. Further, we must openly deal with the overwhelming evidence that peer cohesiveness can work both for or against the organization or unit. Our notional mathematical formulation suggests that peer cohesion works in concert with leader influence or organizational commitment, or both. But peer cohesion in and of itself can very well not be a factor in shaping the outcome of unit performance. (Note: OS = organizational synergy, PC = peer cohesion, L = leader influence, and OC = organizational commitment.)

$$OS = L + OC + (PC \times L) + (PC \times OC) + (L \times OC) + (L \times OC \times PC)$$

The above formulation also suggests that there are both main effects of the other two components of organizational synergy as well as the indicated interaction effects. It is the multiplicative nature of the elements of synergy that provide the accounting for extremely, highly motivated units in the face of danger and adversity. It may be helpful to provide some notional examples of the above formulation.

CASE 1: Peer cohesion is very high; leader influence is low;  
organizational commitment is low. This situation could  
represent the classic case of "rate restriction" of the well-known

Hawthorne Studies where certain groups pursued self-interest at cross purposes with both the organizational leadership and the organization itself. In other words, all the interactive and additive terms were near zero.

CASE 2: Peer cohesion is very high; leader influence is very high; and organizational commitment is relatively low. This situation, we suggest, approximates the classic case in the Shils and Janowitz (1948) Wehrmacht study. One additive term is very high and one interactive term is at or near a maximum.

CASE 3: Peer cohesion is low; leader influence is high; and organizational commitment is low. We suggest that there is still a degree of organizational synergy but only through direct leader influence. It seems to us that a group or unit could possess a reasonable degree of motivation toward organizational goals if but through the regard and loyalty to the leader. One additive term would be high but no interactive term would be high; thus, resulting in some but not a lot of motivation.

CASE 4: Peer cohesion is low; leader influence is high; and organizational commitment is fair. We suggest that this case best portrays the situation described by Moskos (1970). Recall that Moskos found very little bonding in primary groups, but did find a latent regard for the cause of the Army in Vietnam. Thus, organizational synergy could be very reasonable, depending to a high degree on the specific unit leadership. In this example, we are assuming competent leadership; therefore, we should see two additive terms with good values, plus one interactive term ( $L \times OC$ ).

CASE 5: Peer cohesion is high; leader influence is low or nonexistent; organizational commitment is high. This situation would represent a classic case of a highly motivated group succeeding in spite of its leader. One additive term would be high and one interactive term would be high. It would suggest that high organizational commitment could substitute for poor leadership just as in Case 3, leadership substituted for a lack of both peer cohesion and organizational commitment.

CASE 6: Consider the extreme situation where peer cohesion is high, there is excellent leadership, and high organizational commitment. Both additive terms and all three interactive terms would be high, resulting in the best possible motivational conditions. We suggest that there were such situations, especially at the beginning of WWII in certain units of all participants. Also, such conditions may exist today in certain elite units and sports teams, such as the US Olympic Basketball Team.

Of course, the hypothesized mathematical formulation is not meant to specifically suggest that the interactions must be a straight multiplicative relationship; rather, we merely are indicating a nonlinear relationship.

It is now time to consider the determinants of the elements of organizational synergy. Section Three extracts from both the context specific and context free literature, possible determinants. This section is summarized in Table 1.

Table 1  
Specific Determinants of Three Aspects of Synergy<sup>a</sup>

<u>Determinants</u>	<u>Peer Cohesion</u>	<u>Leadership Relationships</u>	<u>Organizational Commitment</u>
<u>Organizational Variables</u>			
Climate		X	X
Communication		X	X
Control		X	X
<u>Individual Variables</u>			
Level of Values		X	X
Demographic Characteristics		X	X
<u>Group Variables</u>			
Size of Group	X		
Homogeneity of Values	X		
Demographic Similarity	X		
Participative Decision-Making	X	X	X
Competition (Internal)	X		
Shared Successful Experience	X	X	X
Unit Identification			
(Distinctiveness)	X		
Adversity (Initiation)	X		
Leader Competence		X	X
External Threat	X	X	X
External Competition	X	X	X
Duration of Group	X		
Frequency of Interaction	X		
<u>Task Variables</u>			
Type of Task or Work	X	X	
Physical Proximity of Work			
Group Members	X		
Psychological Experience			
of Task or Work			X
<u>Policy Variables</u>			
Rotation or Replacement	X	X	
Equipment, Resources		X	X
Housing Policy	X	X	X
Benefits, Dependents' Support			X
Contrast in QOL between			
Enlistees and Officers		X	

<sup>a</sup> An X in the table indicates that a variable is hypothesized to be a major determinant of a given aspect of synergy.

## SECTION THREE

### GROUP COHESION

#### ORGANIZATIONAL VARIABLES: DETERMINANTS OF THE ELEMENTS OF ORGANIZATIONAL SYNERGY

Three interrelated organizational variables are suggested as determinants of leader-subordinate relationships and group-organizational goal consistency. In a punitive organizational *climate*, a high degree of *control* is exercised by leaders and commanders over the other members in the organization. Little deviation from prescribed ways of doing things is permitted; individuals are punished for their deviance and failures. In this type of atmosphere, individual members are more concerned about their safety (and staying out of trouble) than they are concerned about the degree to which group or organizational goals are met. Subordinates are apt to distrust their unit leaders and their organization as a whole, and any kind of open, constructive *communication* is unlikely to occur. Where the *climate* in the organization is to emphasize the correction of failure and members are coached to higher levels of personal and group effectiveness, the type of *control* exercised and the quality of *communication* are likely much different. This punitive-supportiveness dimension of organizational climate is apt to have its greatest influence on leader-subordinate relationships and the degree to which groups and group members accept organizational goals. While not suggested in Table 1, it is also likely that an organizational climate emphasizing punitive control will have effects on the extent of individuals' helping each other and negative within group competition.

#### INDIVIDUAL VARIABLES

There are a number of individual characteristics that it seems reasonable to expect will have some influence on organizational synergy, and data documenting the importance of some of these variables is currently available. The individual characteristics most often suggested are the values held by the soldier. Commitment to working as a team and valuing team goals more than self, patriotism, organizational loyalty, discipline, responsibility, and physical fitness and stamina are values that would be consistent with those of a military career.

Demographic variables such as race, marital status, social class, age, and regional origin have been associated with more or less of a tendency to form strong group cohesiveness. When directly related to organizational synergy, these demographic variables are most likely imperfect proxies for the values held by the individual recruit.

Examples of individual variable correlates that have been identified in previous research include intelligence and adjustment (Mann, 1959; Scribner *et.al.*, 1985), religion (Festinger, 1950), similarity of beliefs (Rokeach, 1960), task performance (Goodacre, 1951), social or political alienation (Dalton, as referenced in Etzioni, 1975; Westbrook, 1980).

When considering both individual values and demographics it is important to remember that there are two ways in which individual characteristics can influence group cohesiveness. The relationship indicated in Table 1 and discussed in this section simply hypothesizes that there are some people who hold values that are consistent with those of a military organization and working as a unit. Individual variables may also be important

insofar as they facilitate or inhibit attraction and assimilation with a peer group. In this context, it is important to consider whether a group of individuals is diverse or similar with respect to individual characteristics. The more similar the individuals in a group the more likely the members will be mutually attractive to one another and that at least one aspect of group synergy as we define it above and in Figure 2 will be present.

## GROUP VARIABLES

As indicated in the previous paragraph, we are hypothesizing that units consisting of individuals who are homogeneous with respect to values and demographics are likely to be more cohesive working units. There is a great deal of empirical literature documenting the effect of similarity and cohesiveness (e.g., Terborg, Castore and DeNinno, 1976; Mitchell and Larson, 1987). Perhaps, the earliest empirical evidence of the importance of homogeneity in military units came from Shils and Janowitz' (1948) observation that most World War II German units were composed of soldiers with similar ethnic and national backgrounds and that deserters usually came from units of varying nationalities. In measuring the homogeneity variable it is important to recognize its group nature and that absolute level on any variable is not important, but rather the differences among group members.

Participative decision-making may lead to greater cohesiveness for several reasons. A perception that one has contributed or had input in a group's decision should lead to greater commitment to group goals. Further, this participation should emphasize the organization's view that group members are valued and valuable components of the organization and promote a greater coincidence of group and organization goals. Participative decision-making may be difficult to achieve in a military combat unit where relatively instantaneous reaction to directives is often necessary, but there are likely many issues on which participation is possible. Certainly in many non-combat situations decisions involving task assignments, division of labor, release time and so forth could be participative in many cases.

Internal competition among members for promotions or for various types of rewards would most likely serve to decrease peer cohesiveness. External threat (George, 1971; Stouffer *et.al.*, 1949; Janis, 1963; Johns *et.al.*, 1984), or competition (Janis, 1963; Siebold, 1987; Johns *et.al.*, 1984) with other units usually increases cohesiveness. In combat, of course, the external threat is significant and obvious though group members must perceive its immediacy if an effect on cohesiveness is to be expected. With modern warfare, the immediacy of an external threat may not be obvious until it is too late. Further, inter-unit competition may foster in-group cohesiveness but be detrimental to overall organization goals when these highly cohesive competitive groups must work together. This problem has been frequently encountered in non-military work contexts.

Some relatively concrete aspects of groups and their members' interaction also seem related to aspects of synergy. For example, there appears to be an optimal level of group size (Watson, 1978; Henderson, 1975; and Hackman, 1987). Duration and frequency of group interaction have also been found to be correlated with peer cohesion (Johns *et.al.*, 1984).

Shared successful experiences also can contribute in a number of ways to increased group cohesion. If these experiences require coordinated efforts from all personnel, group members are apt to become more familiar with each other and develop expectations regarding other members' contributions. Opinions of the leader who serves to coordinate the group will be enhanced because she/he was able to effectively guide the group. The

group effort and recognition of the group also serves to bring recognition to group members. When an individual performs well, he/she will experience enhanced esteem as a function of the fact that other group members are also successful. Note that this recognition that group success leads to group cohesion means that the synergy-performance relationship is reciprocal. This is likely under combat conditions; its importance was noted by Shils and Janowitz in their study of German Army units in World War II. However, we include shared success experiences in the part on group variables because it may also be possible to manipulate or structure training experiences such that groups will have the type of shared experiences that will lead to greater cohesion.

Emblems, mottos, mascots, and other signs of unit distinctiveness have long been used by the military as well as other organizations to increase feelings of belonging. There is not much by way of actual empirical evidence that these attempts are successful in increasing group cohesion or performance, but if they are effective, it would most likely be because they promote horizontal bonding or peer attraction (Etzioni, 1975).

Initiation rites are used by many different types of organizations (fraternities or sororities, religious organizations, and military academies, for example) to increase members' feelings of belonging. The initiations have some support in the social psychological literature based on the premise that if one works very hard to gain acceptance in some group then she/he will be even more likely to believe membership is desirable and worthwhile than before the initiation. To our knowledge, there have been no actual experimental studies of the effect of differing levels of initiation severity. However, it is probably true that the initial rites that mark entry into Army units are perceived as relatively severe by most military recruits and that they should serve to enhance group cohesion.

As noted above, peer cohesion may not always work to the organization's advantage. When group and organizational goals are inconsistent, group cohesion can be of considerable concern. Hence, peer cohesion must be directed by the group leader. In order for a leader to be effective in leading a highly cohesive group, as defined by Bass' (1984) five dimensions, he/she must also have a great deal of task competence (George, 1971), must be capable of obtaining resources necessary for group survival and goal accomplishment (Shils and Janowitz, 1948), and must have a great deal of formal and informal power. The key role of leadership in producing highly performing and cohesive military groups has been cited by a variety of authors (Janowitz and Little, 1965; Savage and Gabriel, 1978).

In summary, there are a host of group variables that either have been shown to have an effect on group cohesion or are theoretically linked to group cohesion. In our next paragraph, we describe three aspects of the task that may have influence on group synergy.

#### TASK VARIABLES

The task itself, in particular tasks that require individuals to interact with each other and which demand interdependence of members, influences the degree of group cohesiveness. Again, it may be possible to structure various training tasks so as to maximize reciprocal interaction between group members as well as interdependence. Similarly, the way in which the task is physically arranged can also affect interaction and cohesiveness. Tasks that are arranged so that all group members work in close physical proximity will likely generate more interaction even when interaction is not required by the task (Festinger, Schacter, and Bach, 1950). This increased interaction usually leads to higher group cohesiveness.

Several other task variables which we have labeled "psychological" aspects of work have also been related to cohesion in previous research. These variables include the importance of the mission to be accomplished (Stouffer, 1949), soldiers' sense of professionalism, the degree to which the task is motivationally engaging, task challenge, presence of specific performance objectives, and the existence of a reward system for task accomplishment (Hackman, 1987). Note that we hypothesize that these variables will have their primary impact on synergy by virtue of their relationship to organizational commitment.

#### POLICY VARIABLES

This set of variables constitutes a variety of actions that organizations can take which may have some intended or unintended effect on group synergy. Certainly the policy area which has most frequently gained attention in the military context is that of rotating personnel from unit to unit or in and out of combat zones. The very nature of group synergy involves time and energy on the part of individuals and, as we suggested above, shared successful experiences. When the individual is moved to a new unit, the time and energy investment is lost, and he/she must now make a similar effort to gain acceptance in a new group. As continued moves occur, the individual is almost certain to approach new groups with lessened motivation to become part of the group. Several different rotational policies have been suggested (Siebold, 1987), such as a replacement system based on groups rather than individuals and minimizing "temporary" assignments. Cohesion results when there is predictability of relationships among group members. Without some stability, such predictability cannot occur.

Several different authors have mentioned the importance of equipment and resources in fostering group cohesion. If a group is not properly equipped, the group will find it difficult to accomplish its goals; ultimately, group members will lose confidence in each other and in group and organizational leadership.

Housing policy obviously becomes an issue primarily in training or peace-time units. The issue often revolves around allowing married personnel to live with their families as opposed to common Army barracks, but may also involve various living arrangements possible for single personnel as well. The notion is that cohesion can develop more rapidly and become stronger if individual group members work and live together. Army policy has generally dictated that trainees live and work together but allows others, including the training group leaders, to live elsewhere. It may be difficult to adopt an optimal housing policy with regards to group cohesion because one of the other policy variables which affects synergy involves the benefits and support provided group members' dependence. If individuals' family members are not well cared for, or there is concern for or dissatisfaction with their welfare, then the individual will be unlikely to be motivated to form strong attachments to other group members and commitment to group goals. Obviously, worries about family members are likely multiplied by physical separation.

Another policy variable that may have some impact on group cohesion is the relative separation of military enlistees and the officer corps. The separation is both physical (as mentioned above) and material. Officers have traditionally had significantly more privileges and income, separate clubs, separate activities, and separate lives. The perceived contrast in quality of life was certainly great. One of the speculations regarding why groups developed greater cohesion in combat situations is that officers and soldiers shared the same danger and same adversities of life style in the combat situation. This leveling effect increased the vertical bonding between soldiers and unit leaders.



Finally, the incorporation of Mowday *et al.*'s (1982) notion of organizational commitment as an aspect of organizational synergy introduces further support for the possibility that the variables listed in Table 1 are indeed determinants of synergy. Mowday *et al.*'s extensive review of the empirical research on organizational commitment led to a classification of four major categories of determinants of commitment: personal characteristics, role-related characteristics, structural characteristics, and work experiences. Personal characteristics (age, tenure, education, gender, and personality) are represented in our Table 1 as Individual Variables. Role-related characteristics, as defined by Mowday *et al.*, include clear and challenging job assignments, ambiguity, conflict, and stress. These role-related characteristics are similar to variables we identified above and in Table 1 as Psychological Aspects of the Task. Results of research on variables defined as structural characteristics have been mixed. Organization size, union presence, span of control, and centralization are unrelated to commitment. Worker ownership and participation in decision-making are positively related to commitment as suggested in the Group Variables section of Table 1. Mowday *et al.*'s Work Experience factors are most similar to the variables we defined as Psychological Experience of Work or Task. They include: (1) the extent to which employees felt that the organization could be counted on to look after employees' interests; (2) feelings of personal importance to the organization; (3) the extent to which employee expectations were met; (4) perceived pay equity; and (5) degree of social involvement in the organization.

In this section, we have provided a comprehensive listing of the variables which are likely to have an impact on one or more aspects of the phenomenon we have labeled organizational synergy. Variables are included in this listing for conceptual reasons and because of research that has indicated that they are correlated with peer cohesion, leadership, and/or organizational commitment. Since one purpose of research on synergy might be to influence its development in military units, efforts to collect data on synergy should include measures of these variables. In developing measures and collecting data, care must be taken to minimize effects of response-response bias. As suggested measures of the aspects of synergy are perceptual and are likely to be collected via questionnaire, it is likely this response-response bias problem would be most severe when determinants are also perceptual (*e.g.*, psychological aspects of work) and measured by questionnaire.

#### RELATIONSHIP BETWEEN SYNERGY AND OUTCOME VARIABLES

Our model suggests that organizational synergy has two direct outcomes--stress and performance. Further, both outcomes, in turn, may affect synergy. We have already referred to the fact that the causal relationship between performance and cohesion is reciprocal, but it is certainly likely that stress reactions also lead to lowered synergy as well. Removal of a valued and attractive group member from the unit obviously means that she/he is no longer available to play any role in the group, but it is also likely that such removal will increase self doubts regarding the group's ability to accomplish its goals.

Work on stress, particularly work on recent Israeli conflicts, suggests that there may be two distinct types of stress reactions, both of which are affected by organizational synergy. Examination of psychiatric casualties in World War II has indicated that after 200-400 days, combat soldiers often wear out, developing a jitteriness and hypersensitivity to shell fire that was incapacitating to themselves and of significant effect on soldiers new to the battle front. This more or less long-term development of a stress reaction is different from that recognized in more recent conflicts. In the Yom Kippur War, fighting was so intense that psychiatric reactions occurred after several hours. As a consequence, the Israelis have made a distinction between combat reactions which develop after a few hours or days, and combat fatigue which develops after weeks and months of moderate levels of fighting. Of

most importance for this section, however, is the finding that the severe combat reactions were more likely to occur in units that had been assembled ad hoc for purposes of fighting the Yom Kippur War as opposed to units that had existed prior to the conflict. Apparently, some form of group synergy had a significant impact on the number of combat reactions. What has not been studied previously are the effects of group synergy on less severe forms of stress or even the effects of stress on non work-related behavior (e.g., family relationships). Given that it is difficult to conduct research on or stage a war of any great duration, it might be possible to measure stress reactions of a less severe nature on the assumption that group synergy would have the same effect on these less severe forms of stress as it does on the more severe and dramatic psychiatric cases that occur in actual combat.

Measures of performance in research studies of synergy obviously will depend on the goals of the units being studied. Organizational synergy as defined in this paper should always have a positive impact on the level of performance. However, synergy should also have an impact on the variability of performance across group members (assuming an index of individual performance is available). The reason for this hypothesis is that members not very well integrated into the group will not share group goals and norms and should perform differently (either better or worse) than the majority of group members. While this variability hypothesis is certainly consistent with previous conceptual treatments of the expanded definition of cohesion, little empirical work has been published on the group cohesion-performance variability relationship, probably due to the difficulty of measuring performance outside the laboratory.

We have just summarized our overall view of group cohesion, its components, determinants, and outcomes. There are certainly other possible factors, particularly determinants, that are not included in our model. However, we believe that we have identified the major factors that are conceptually related to cohesion or have been empirically related to cohesion in past research efforts. In the next section, we discuss some major measurement and research design issues that a program of research on organizational synergy will need to address.

## MEASUREMENT AND RESEARCH DESIGN ISSUES

### ANALYSIS OF RECIPROCAL RELATIONSHIPS AND FEEDBACK LOOPS

The complete model of organizational synergy presented later in this paper in Figure 5 is based on theoretical and empirical research, all of which suggests that group synergy very likely determines group performance, but that group performance in turn affects continued group synergy. This hypothesized reciprocal interaction presents particular types of design and data analysis problems. First, to determine the relative strength of the two directions of causality, longitudinal research should be conducted. Manipulations of each variable in turn while observing effects in the other variable at some later time period will allow a more realistic assessment of the nature of the causal relationship between synergy and performance. If only field correlational data are collected, there are several options. If data on synergy and performance can be collected at multiple points in time, then lag sequential analysis of the type described by Gottman (1979) and more recently by Faraone and Dorfman (1987) is appropriate. This method is a relatively simple straightforward method to analyze complex interactive sequences of behavior. The type of data to which this technique is applicable are presented in Table 2. In this table, W refers to a group having a successful experience (or Win), L refers to a group's failure or loss, Lo and Hi refer to high and low measured group synergy. If one looks at the data in this table, it is clear that a successful group experience in one time period is always followed by high

group synergy in the next with one exception, that being time periods 8 to 9. The procedure described by Faraone and Dorfman (1987) provides a statistical test of the hypothesis that values of one variable (in this case, synergy) follow values of another variable (performance). Data such as this would constitute relatively strong evidence of the causal impact of group performance on group synergy. With longitudinal data on both measures, this type of research design would be both feasible and valuable.

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Table 2  
Sequence of Measures of Performance and Organizational Synergy

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	<u>Time Interval</u>											
<u>Measure</u>	1	2	3	4	5	6	7	8	9	10	11	12
Group Performance	W	L	L	W	W	L	L	L	W	W	L	W
Organizational Synergy	Lo	Hi	Lo	Lo	Hi	Hi	Lo	Lo	Hi	Hi	Hi	Lo

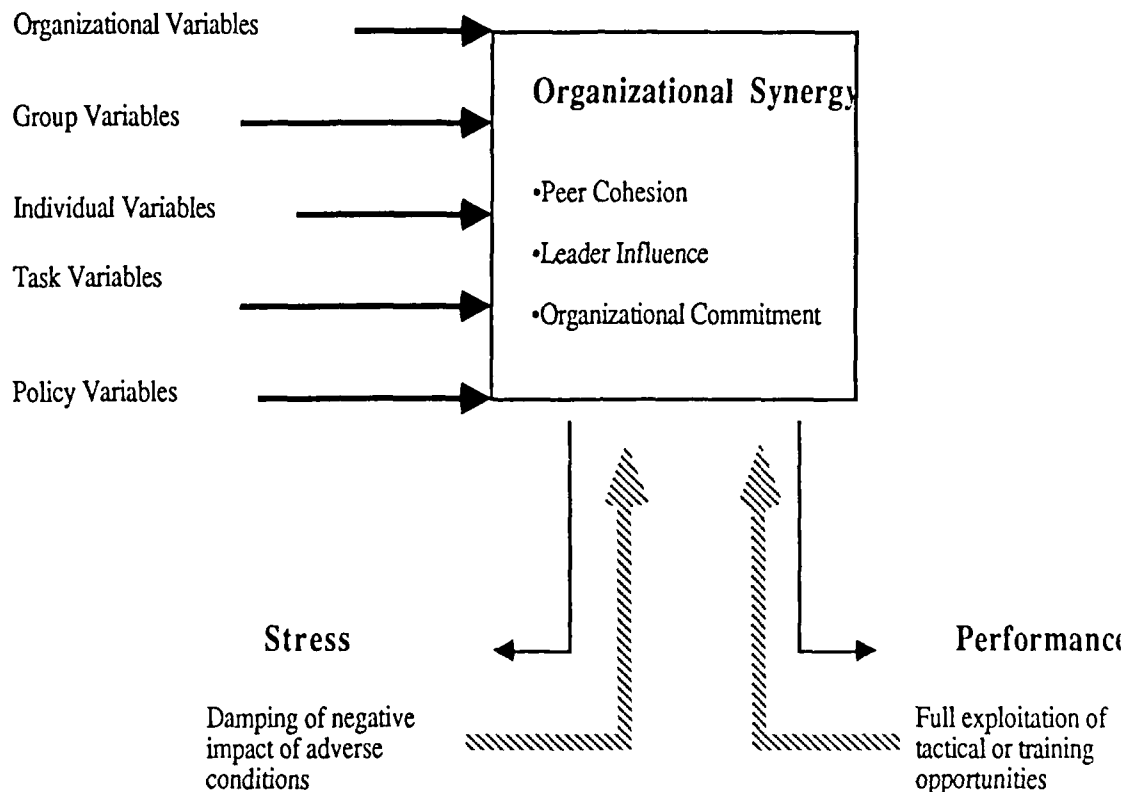
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Note: W refers to Win, L stands for Loss; Hi and Lo refer to high and low organizational synergy.

Probably, more likely will be the fact that we have cross-sectional data on both variables and that we will want to test an hypothesis of reciprocal causality. At least two techniques are available to test this type of data: two stage least squares and linear structural equations analysis. An example of the use of the two techniques is provided in Schmitt and Bedeian (1982). A brief description of these procedures follows.

Two stage least squares (2SLS) has been outlined by James and his colleagues (James and Jones, 1980; James and Singh, 1978). The nonrecursive model in Figure 4 of this section involves three endogenous variables (synergy, stress, and performance) and five exogenous variables (ignoring the fact that each variable in Figure 4 is actually a group of variables). The 2SLS procedure involves the following steps. First, each endogenous variable was regressed on all exogenous variables. Consistent with Hout (1977), all variables are standardized prior to the first stage least squares analysis. Predicted values of stress and synergy (or performance and synergy) based on these regression equations have the desired property that they are unrelated to the residuals of these equations. Thus, the first stage least squares analysis has the function of removing the residual from the dependent or endogenous variables.

**Figure 4: Model of Major Determinants and Outcomes of Organizational Synergy**



Second, the predicted values of synergy and stress (or synergy and performance) are computed. Third, the second stage of 2SLS is accomplished by regressing each endogenous variable on the standardized exogenous and endogenous variables with which it has a direct relationship. However, the endogenous variables that are reciprocally related are replaced with their unstandardized predicted scores from the first stage equations. The regression coefficients for the synergy variable in the stress and performance equations are taken as path coefficients from synergy to stress (or performance). Likewise, the regression coefficients for stress or performance in the synergy equations are taken as path coefficients for the stress-to-synergy and performance-to-synergy relationships.

Several assumptions inherent in the causal modeling process using data collected at a single point in time in general, and 2SLS in particular, should be noted. We assume that the causal effects have occurred rapidly, that the system of relationships among the variables is stable at the time of data collection, and that the directions of causal flow are correctly specified. Linear and additive causal effects are assumed as well as measurement on reasonably interval and reliable scales. Further, the error terms are assumed to be normally distributed with means of zero. As discussed below, we also assume no significant unmeasured variable problems.

Data can also be analyzed using LISREL (Joreskog and Sorbom, 1981), a program that yields a maximum likelihood solution for the parameters suggested in Figure 4. The program estimates the specified parameters among the independent and dependent variables as well as between underlying and observed measures of variables and the uniqueness associated with each variable. That is, the program simultaneously evaluates the structural model and the measurement model hypothesized to account for the observed data. The program computes a reproduced correlation matrix based on the parameter estimates and a chi-square test of significance of the difference between the observed and reproduced correlation matrix. Further, of key interest in this section is the capability to estimate reciprocal effects. Joreskog (1978) provided the mathematical background for the procedure and Burt (1973) and Maruyama and McGarvey (1980) discussed its use and provided examples.

A requirement of both 2SLS and LISREL is that the exogenous variables are unrelated to the error terms associated with the two endogenous variables. This is referred to as the unmeasured variables problem and it occurs when some variable that is a cause of the endogenous variable(s) is correlated with the exogenous variables in the model. For the unmeasured variable to be a significant problem, it must make a unique contribution to the prediction of the endogenous variables. That is, one need not worry about unmeasured variables that are redundant with measured variables. The consequence of this problem is a biased estimate of the structural parameters relating the endogenous and exogenous variables in the model.

In summary, hypothesized reciprocal relationships generate difficult data analysis and research design problems. We suggest three ways to proceed: (1) deliberate attempts to manipulate synergy or performance in a field experiment; (2) collection and analysis of lagged sequential measures of the variables hypothesized to be reciprocally related; and (3) use of either the 2SLS or linear structural equations to analyze cross-sectional data. The latter, however, provides only evidence of the plausibility of a particular causal model; other models may also fit a given set of empirical relationships.

#### NONLINEAR OR INTERACTIVE RELATIONSHIPS AMONG VARIABLES

The model depicted in Figure 4 and described above is linear in that we hypothesize that as a determinant of synergy (e.g., homogeneity of members' values) increases we will see a direct positive or negative effect in group synergy. Occasionally it seems conceptually appropriate to test more complex curvilinear or interactive effects. For example, we might hypothesize that the effect of severe external threat in combat may be moderated by competent leadership, such that those units with good leaders will remain intact and perform well while those units with inexperienced or poor leaders disintegrate. Curvilinear and interactive hypotheses are best evaluated by means of power and product terms in regression analysis (Cohen, 1978) though few empirical examples of these effects have been reported (Dawes and Corrigan, 1974).

Another possibility presented by Siebold is that we use the three aspects of synergy to create a typology of Army units. The simplest form of this typology would involve classifying each unit as high or low on peer attraction, leader-subordinate relationships, and organizational commitment. Using a mean or median split to dichotomize units on these three variables would produce eight independent types. We could then attempt to understand these three aspects by using a discriminant analysis in which various potential determinants of the eight possible group types could be used to predict group membership.

Analysis of interactive relationships and the typing of groups suggested in the previous paragraphs allow the testing of much more sophisticated hypotheses about group synergy. However, these procedures necessitate development of highly reliable measures with low intercorrelations between different measures. Low reliability greatly decreases the power of interactive and curvilinear effects in regression analysis. High intercorrelations between the various aspects of group synergy will mean that the different types of groups will not be reliably distinguished from each other. The large sample sizes available in a military context will increase the power of these tests, but effect sizes will likely be small.

#### LEVELS OF ANALYSIS

The unit of focus in this section has been the group, hence the objective of measurement of the variables in Table 1 is to assign a member to a group. However, measures of many of the variables in this table will be collected from individuals, likely including the measures of synergy, stress, and in some instances performance. Conceptualization at the group level and measurement at the individual level produces potential problems of aggregation. We must be concerned with (1) what defines a unit; and (2) what types of statements we can make about groups based on individual data; and (3) what statements we can make about individuals based on group data. The latter is important because some hypotheses and perhaps some interventions designed to increase the cohesiveness of Army units may be directed at individuals.

The appropriateness of the aggregation of individual level data (for example, the value and demographic variables in Table 1) to get group scores which are then related to inherently group data (for example, leader characteristics or group performance) depends on the degree to which it makes theoretical or conceptual sense to say that these attitudes and demographic variables are characteristics of the unit. For example, differences in the clarity of articulated personnel policies may result in unit differences in the job satisfaction and climate variables, hence they might justifiably be aggregated. Beyer (1978) has suggested that a minimal statistical test of whether the ratio of the variance of responses between groups is significantly larger than the variance of responses within organizations. If this F-ratio is significant, we have support for the existence of a particular construct as a property of the groups in question. A measure of the internal consistency of group members' responses can also be obtained by intercorrelating individuals' responses across groups and computing the intraclass correlation coefficient (James, 1982). The size of this index of internal consistency would be a useful adjunct to the F-test proposed by Beyer because it provides an index of the *level* of agreement of individuals within a group.

If the F-ratio is not significant or the intraclass correlation is very small, the construct may apply only to the individual level of analysis or the investigator may have erred in its operationalization. A nonsignificant F-ratio indicates lack of within-group consensus concerning the variable in question, or in a psychometric sense, a lack of respondent consistency. When aggregation seems reasonable conceptually but there is no unit consensus, a careful rewording of items may indicate to the respondent what level of analysis one is interested in. In this context, it may be better to ask questions that one is interested in aggregating in a descriptive sense rather than an evaluative one. For example, it would seem better to ask people how often they offer suggestions to officers about work procedures than how they feel about participating in their company's activities.

In summary, two variables that are to be correlated must be at conceptually similar levels of analysis. The decision to deal with aggregate or individual data makes sense only when it is relevant to the question of interest. A theoretical base for one's investigation or at least an educated guess as to the relevant variables affecting the phenomenon of interest

will dictate the level of abstractness. In the case of group synergy, studies of the effect of attitudes or perceptions of the unit leader using groups as subjects certainly make conceptual sense. The appropriateness of their aggregation should also be checked empirically using Beyer's F-test or an index of member agreement.

Another aspect of the aggregation problem has been addressed by various sociological researchers. Robinson (1950) brought the "ecological fallacy" issue to the attention of social researchers forcefully when he concluded that one cannot use aggregated data to make inferences about individual correlations. He showed why the ecological correlation based on aggregated group data was likely to be higher than a similar correlation based on data collected from individuals except in the case in which individuals are randomly assigned to groups. That this is reasonable is seen where the scatterplot for individuals indicates a correlation of approximately .5. However, if one computes the correlation between  $x$  and  $y$  using group means, the correlation would be 1.00 in the case depicted, or at least higher than the correlation based on individuals. It should be noted that the correlation of  $x$  and  $y$  within any one group would be close to zero. Hammond (1971) has identified this situation as one of "homogeneous grouping" and rightly indicated that it is not a serious problem because the regression coefficients for individual and grouped data are identical in this case. Consequently, these regression coefficients are useful in drawing inferences about individuals from aggregate data. It should also be noted that Hammond, and sociologists in general, are usually concerned about inferences from the aggregate level to the individual when the individual level data are nonexistent or hard to retrieve, so the nature of these relationships is extremely important. This inability to get individual data may also occur in studies of group cohesion when, for example, investigators collect and correlate company turnover, performance, or percent of psychiatric casualties with personnel practices.

What Hammond (1973) labels aggregation bias, however, does present even more serious problems when one hopes to make inferences about individuals based on aggregated data. Aggregation bias occurs when the relationship between the variables of interest is systematically different in the different aggregate units. This is a specification error in that the variable defining the difference in aggregate units is not identified and included in the set of hypothesized relationships. These specification errors occur when deviations from equality of within-group regressions are systematic. For example, if one is interested in the relationship between sex and group synergy, and the proportion of people of one sex or another affects the proportion of the group that reenlists or has some stress-related problem, one has aggregation bias. Whether aggregation bias of this type is a problem or not depends on whether or not there are systematic differences between units in the proportion of female or male members. Obviously, one needs to know the phenomenon he/she is interested in before data collection in order to collect data on the appropriate variables. It is equally obvious that this is not always possible, but it does suggest that an appropriate data collection strategy is to collect a wide variety of background data so that various possibilities of aggregation bias can be investigated post hoc. If one has data on the appropriate variables both at the individual level and the group level, there are a number of guides that indicate the likelihood of problems associated with cross-unit inferences and/or the appropriateness of aggregation. Recently, Burstein (1978) has evaluated the usefulness of three approaches to testing the appropriateness of grouping methods. Two of these methods--the structural equations approach (Hannan and Burstein, 1974) and the X-rule (Firebaugh, 1978)--proved adequate in estimating differences in individual and group coefficients when various types of aggregation bias were present.

The question of concern has to do with the degree to which the regression coefficient relating  $x$  and  $y$  at the individual level ( $\beta_{yx}$ ) and the aggregate level ( $\beta_{YX}$ ) diverge.

Hannan and Burstein (1974) dealt with the problem by expanding the linear model to include the relation of the grouping variable (Z) to both X and Y. These latter relations are then used to forecast the consequences of grouping by any specific characteristic. Formally, the difference between the individual and aggregate coefficients is shown to be equal to:

$$D_{HB} = \beta_{YZ.Z} \beta_{XZ} \frac{\partial^2_z}{\partial X^2} - \frac{\partial^2_X}{\partial X^2}$$

where z represents an ordered grouping variable and  $\partial^2$  is the variance of the variable involved. This equation is instructive because it indicates the conditions under which there is no difference between grouped and ungrouped data, namely,

- (1) Z has no effect on Y when X is partialled out or  $\beta_{YZ.X} = 0$ ,
- (2) Z has no effect on X or  $\beta_{XZ} = 0$ , or
- (3)  $\partial^2_X = \partial^2_Z$ .

When differences between grouped and ungrouped coefficients are observed, then some subset of the three conditions listed above does not hold.

Firebaugh (1978) also provides an extensive discussion of downward and upward aggregation bias problems and indicates that downward cross-level inferences avoid bias when the group mean on X is unrelated to Y with X partialled out.

Both of these approaches are useful in the single predictor case, but they become cumbersome and impossible as the number of regressors increase and/or the grouping variable is a nominal one. Most importantly, these techniques are useful only when one has both grouped and ungrouped data; when this is true, however, one can compare the coefficients directly. Such procedures might be useful when it is too expensive to analyze all the data, though a random sample of the cases would also be appropriate. In some instances, disclosure of individual cases is unethical. When this is true, one could use the procedures above to assess the seriousness of the distortion resulting from aggregation; if there are no differences one could report aggregate data and draw inferences at the individual level.

Where does this discussion lead in terms of practical guidelines when aggregation bias is possible? First, one should heed Burstein's guides for collecting and maintaining data; namely, (1) measure all variables at their lowest possible level; (2) the data from individuals should be matched with data from the groups to which they belong; (3) all information should be identifiable at its lowest possible level to allow retrieval capabilities at multiple levels; (4) use, whenever possible, measures of established reliability and validity. Further, any decision to aggregate individual data should be based on sound conceptual grounds. This means that data on grouped variables which might affect within-group relationships must be collected. Fortunately or unfortunately, we have no better guide concerning what data to collect than that suggested by our theory(ies) and understanding of the phenomena of interest.

Recently, composition models (Rousseau, 1985) have been proposed as one method investigators can use to specify relations among forms of a construct represented at different levels of analysis and to determine how these concepts are related to one another.



Composition models are useful in specifying the relationships between variables presumed to be functionally similar, at different levels of analysis in organizational research. The application of composition theory to organizational climate research and the organizational technology and structure-individual behavior relationship is provided by Ostroff and Kozlowski (1986). Similar careful analysis of concepts and their interrelationship would be useful in making decisions regarding appropriate operationalization of variables in research on group synergy.

#### VARIANCE MEASURES OF GROUP SYNERGY

The normal index of a group's characteristics is the average of group members' scores or level on some measure. So, we would say that a group is highly synergistic if the averages of the group members' assessment of their peers (peer cohesion) and their leadership are high. However, in the cases of these two aspects of group synergy, it might be equally appropriate to consider the variability of group members' reactions to their peers and leader. If a large portion of the group finds other group members highly attractive but a significant minority feels very much alienated from the group, the mean will be high, and the variance will be high (indicating low synergy). In this case it would be more conceptually appropriate to consider the variance of members' reactions to their peers as an index of peer cohesion. The same may hold true for performance if the group performance measure is an aggregation of individuals' performance.

In cases in which the variance seems an appropriate dependent measure, the logarithm of the variance is the appropriate index, because of the nonnormal distribution of variances. O'Brien (1978) has shown that tests for the heterogeneity of variances using the logarithmic transformation are both robust and powerful.

## SECTION FOUR

### FRAMEWORK FOR FUTURE RESEARCH

In this section we present a plan for research on leadership, cohesion, and values. Our major goal is to specify relevant literature, identify concepts to be measured, and show how they can be combined into one statistical model which can be estimated.

#### CONTEXT FREE MEASURES

Earlier in the report, we noted that the concept of organizational synergy represents our major guiding theoretical tool. As such, research in this area should utilize literature in this tradition. We have identified context free measures of all three constructs comprising organizational synergy--peer cohesion, leadership, and organizational commitment. For example, leadership may be measured by the five dimensions expressed in the work of Bass (1984). The dimensions are (1) contingent reward; (2) management by exception; (3) individualized consideration; (4) intellectual stimulation, and; (4) charisma. It is important to note that Bass has constructed scales of these dimensions with known psychometric properties.

Once context free measures have been specified, these measures must be adapted to military organizations (i.e., context specific). Put another way, one would have to take into consideration unique aspects of army organizations when adapting context free measures--"paint it green". As is always the case when scales are revised, one should recalculate psychometric properties of the scales. These procedures should include item analysis, factor analysis, and analysis of internal consistency (alpha). One should pay special attention to intercorrelations among scales designed to measure different constructs.

#### DEVELOPING MEASURES OF DETERMINANTS OF ORGANIZATIONAL SYNERGY AND ITS COMPONENTS

Our section above on the determinants of organizational synergy suggests a wide variety of variables that have been correlated with one or more components of our synergy constructs. However, we did not specify, in most cases, specific measures of those variables. Efforts to assess the importance of these determinants must be preceded by the selection or development of appropriate measures of each of these constructs. As is always the case, literature should be reviewed and evaluated (as to goodness of fit or quality) of the existing measures of these constructs. If one finds that appropriate measures do not exist, then measures must be developed. The development and selection of these determinants would follow normal procedures as identified in the section above. As was the case when developing measures of organizational synergy, context specific measures of the determinants will also need to be developed or "painted green".

#### SPECIFYING CRITERIA OF UNIT PERFORMANCE

It is very important for researchers in this area to extract from the organization agreed upon criteria for judging effective units. This procedure will by definition involve the subjective judgment of "experts." Having ascertained the criteria, the next step is to develop or select measures of the criteria. Unlike measures of the determinants and

constructs of organizational synergy, the emphasis in performance measures should be considerations of test re-test reliability or stability.

#### TEST OF THE MODEL

The model of cohesion developed above suggests that organizational synergy is an intervening variable between its determinants and unit outcomes. Therefore, tests of this model and of the importance of the organizational synergy concept involve assessments of the direct and indirect effects of the determinants on unit outcomes. Basically, there are four questions to which research should be directed: (1) to what degree is organizational synergy related to unit performance?; (2) are the components of synergy additive or interactive?; (3) what are the relative impacts of the determinants of organizational synergy?; and; (4) do the determinants of organizational synergy have direct impact on unit performance or are these effects mediated by organizational synergy? It is also possible that the determinants we identified in Table 1 may have both direct and indirect effects on unit performance.

#### FORMAL EXPRESSIONS OF THE RESEARCH QUESTIONS

**Questions 1 and 2** - The relationship between organizational synergy and unit performance and the nature of the relationship (additive or interactive) can be expressed as:

Additive Model:

$$\text{Performance} = \text{Leadership} + \text{Peer Cohesion} + \text{Organizational Commitment}$$

Interactive Model:

$$\text{Performance} = (\text{Leadership} + \text{Peer Cohesion} + \text{Organizational Commitment}) + (\text{Leadership} \times \text{Peer Cohesion} \times \text{Organizational Commitment})$$

A test of the importance of the synergistic concept, as we discussed above, would involve the test of the significance of the interactive product term in the second equation. It should be noted that the additive effects of leadership, peer cohesion and organizational commitment would be entered first or prior to the product term in the regression analysis suggested by this equation. Tests of the additive model would also yield information on the relative impacts of the components of organizational synergy on unit performance.

**Question 3** - Relative impacts of the determinants of organizational synergy can be expressed as:

$$\text{Leadership} = \text{Determinant}_1 + \dots + \text{Determinant}_n$$

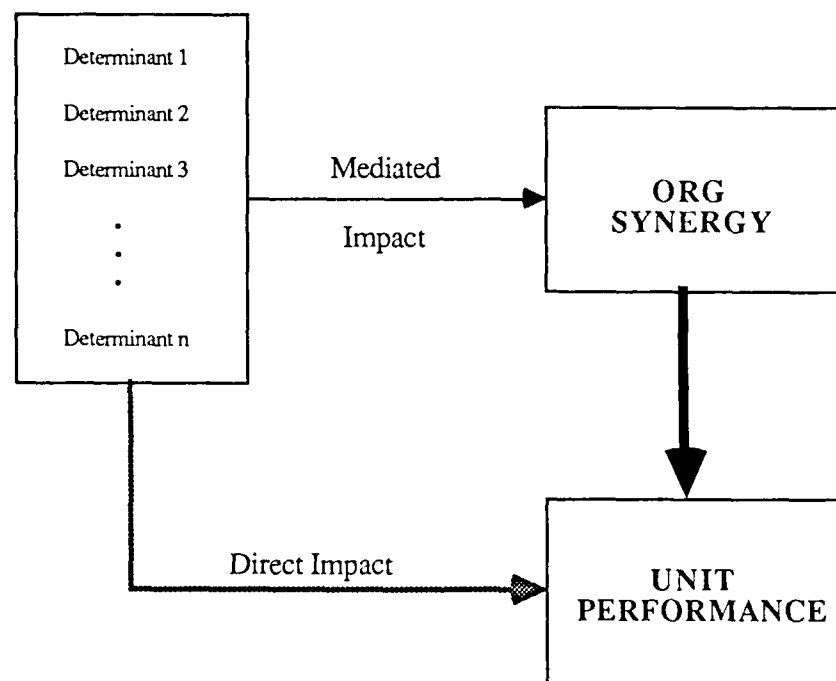
$$\text{Peer Cohesion} = \text{Determinant}_1 + \dots + \text{Determinant}_n$$

$$\text{Organizational Commitment} = \text{Determinant}_1 + \dots + \text{Determinant}_n$$

**Question 4** - Whether organizational synergy mediates the relationship between determinants and unit performance can be expressed, as in Figure 5. Figure 5 is an illustration of the concerns expressed in Question 4. In that diagram, the dotted lines

represent the direct effects of various determinants on unit performance. The solid lines indicate our hypothesized model of organizational synergy operating as an intervening variable. The analysis of structural equations (e.g., LISREL) can be used to test the relative importance of the direct and indirect effects of these determinants on unit performance. Absence of indirect effects of the determinants on unit performance indicates that organizational synergy does not mediate determinant-performance relationships. As indicated in the figure, synergy may have direct effects on unit performance.

**Figure 5: Possible Impact of Determinants on Unit Performance**



Finally, we should note that due to two important considerations (confounding variables in field correlational analysis and restricted variability in certain determinants due to policy decisions) experimental research should be considered as a supplement to field studies.

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